NIEHS Hurricane Response Initiative

Safety Awareness for Responders to Hurricanes: Protect yourself while helping

WORKER EDUCATION & TRAINING PROGRAM

Version 11 - 10/27/05

Workers' Rights

What are employers' responsibilities?

- The Occupational Safety and Health Act requires employers to provide a safe and healthful workplace free of recognized hazards and to follow OSHA standards. Employers' responsibilities also include providing training, medical examinations and recordkeeping.

For more information about OSHA, go to www.osha.gov
or call 1-800-321-OSHA (6742).

Workers' Rights (continued)

What are workers' responsibilities?

- Follow the employer's safety and health rules and wear or use all required gear and equipment.
- Follow safe work practices for your job, as directed by your employer.
- Report hazardous conditions to a supervisor.
- Report hazardous conditions to OSHA, if employers do not fix them.

NIEHS

Introduction

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Emergency in the Field

- For minor injuries or concerns go to:
  - Local hospitals or clinics
  - First Aid or nurse station
- For serious emergencies call 911
  - Know your exact location
- Notify your supervisor or the incident commander about all serious emergencies

Physical Environment

- The Land
  - **Mostly flat, coastal, some areas below sea level**
- The Climate
  (October/November)
  - **High Humidity**
  - **80°F+ day**
  - **60°F night**
  - **Potential for additional storms**

Protect yourself

- Walking over and handling debris that is unstable can cause cuts, scrapes, bruises, sprains, etc.
  - Remain current with tetanus vaccination
    - Revaccinate for a dirty wound if current vaccination is over 5 years old
    - If you will be performing direct patient care or otherwise expected to have contact with bodily fluids, get the Hepatitis B vaccine series
- Avoid contact with stagnant water
  - Wash and sanitize immediately if exposed
- Consider steel toe/shank non-slip footwear if available
- Use durable gloves when handling debris
- Ear Plugs for noisy environments

!When in doubt, contact your supervisor!

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Physical Hazards
And Job Hazard Analysis

WORKER EDUCATION & TRAINING PROGRAM

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Hazard: Confined Spaces

What is a Confined Space?

- Space with limited access
- Large enough for bodily entry
- Not designed for occupancy
- Example: sewers/storm drains

What are the hazards?

- Oxygen deficiency
- Entrapment
- Engulfment
- Hazardous atmosphere

Your Safety Officer Must Approve Confined Space Entry!!!!

Hazard: Confined Spaces

The following must be done before you enter a confined space. Your supervisor must:

- Make sure you and the attendant are trained.
- Ventilate and monitor for hazardous atmosphere.
- Lock out or tag out all power equipment in the space.
- Issue appropriate PPE, possibly including self-contained breathing apparatus (SCBA).
- Establish barriers to external traffic such as vehicles and pedestrians.
- Provide ladders or similar equipment for safe entry and exit in the space.
- Provide good communications equipment and alarm systems.
- Have rescue equipment and trained rescue personnel nearby.

Hazard: Falls from Heights

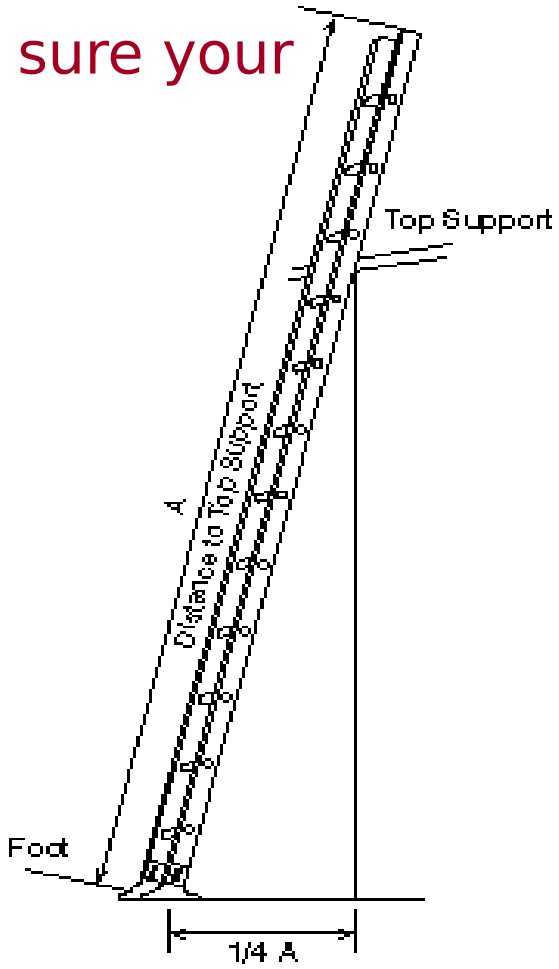
- Employees shall be protected from falls greater than six feet to a lower level.
  - Guardrail Systems
  - Safety Net Systems
  - Fall Arrest Systems (less effective than guardrail and safety net systems)
  - Cover or guard any openings or floor holes as soon as they are created.
  - Make sure floor hole covers support two times the weight of employees, equipment, and materials
  - Be careful when stepping into areas that are unstable/uneven or where the surface cannot be visualized (i.e., if covered by water).

- Workers should prevent items from falling onto people below

Hazard: Ladders

Ladders can create a falling hazard. Make sure your ladder is secure:

- Position portable ladders so the side rails extend at least 3 feet above the landing.
- Secure side rails at the top to a rigid support and use a grab device when 3 foot extension is not possible.
- Do not apply more weight on the ladder than it is designed to support and make sure that the weight on the ladder will not cause it to slip off its support.
- Before each use, inspect ladders for cracked, broken, or defective parts.
- Use only ladders that comply with OSHA standards.



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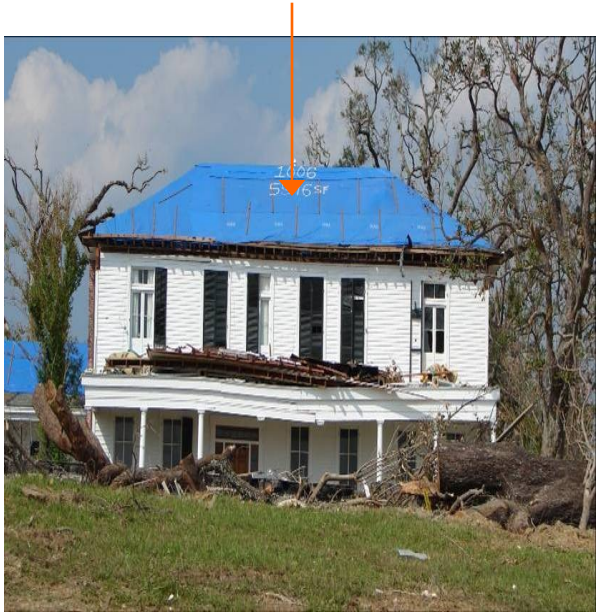
Hazard: Blue Tarps

Blue tarps are designed to temporarily protect building until a permanent roof is constructed.



- Tarping should be done by at least two persons.
- Employers should conduct a job hazard analysis of all work activities with the participation of the workers.
- Employers and employees should ensure that tarps are stored in an area protected from the weather.
- Employees should wear OSHA approved safety glasses when tarping to prevent eye injuries from tarp straps.

Hazard: Aerial Lifts and Manlifts

Vehicle-mounted devices used to get a worker to an elevated position, (also called “cherry pickers” or “boom trucks”).

- **Only trained and authorized people may operate the lift.**
- **Read and understand the safety and operating instructions including all warning decals or labels.**
- **Check for overhead objects before use.**
- **Stay far from debris piles, drop-offs, and floor openin**
- **Never use near electric lines unless they are deenergizied or adequate clearance is maintained.**
- **Refuel tanks only when the unit is off and charge batteries in a well ventilated area away from open flames.**
- **Elevate the lift only when it is on a firm and level surface.**
- **Whenever working out of a manlift, a full body harnes must be worn and properly attached to the basket.**
- **Never drive the manlift when it is elevated above the limit the manufacturer considers safe**

Hazard: QA Towers

Safety measures:

- Guardrails.
- Midrails, screens or mesh between the top rail and surface.
- Protective barriers must be strong enough to support a falling employee.
- Wood, chain and wire rope may be used for top rails and midrails.
- Inspect scaffolds and scaffold components for defects before each work shift, and after any incident which could affect a scaffold's structural integrity.

This QA tower is set up to inspect debris trucks going into dumpsites. The inspector is at risk from vehicle traffic traveling near the tower. Notice in this photo, the lack of buffer zone around the tower. There should be visual markings such as cones, signs or tape to identify the tower to the drivers.

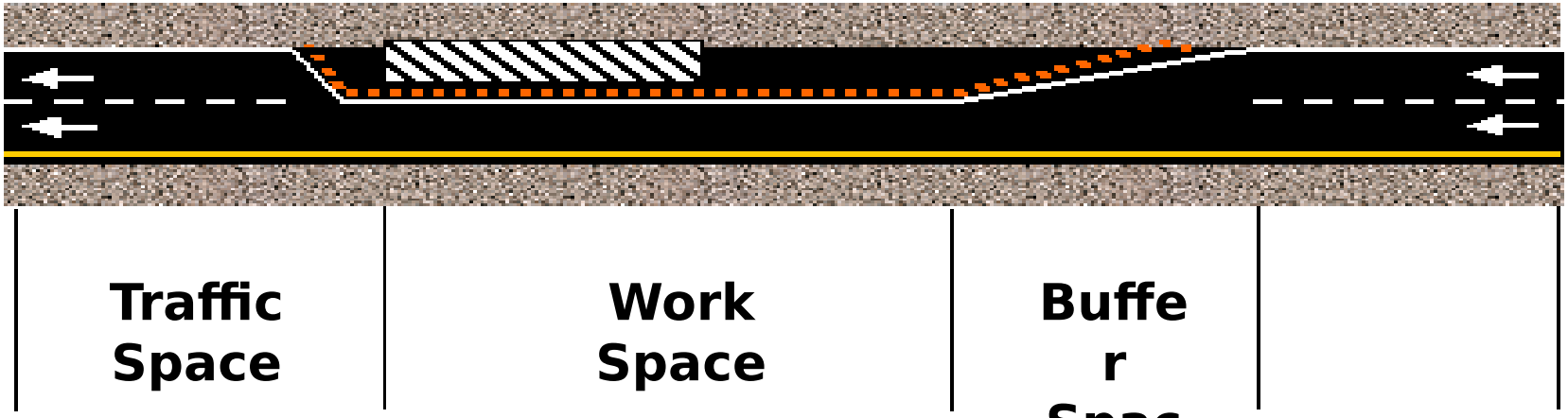
Hazard: Driving and Traffic Issues

- Construction areas must be posted with legible traffic signs at point of hazard.
- Flag persons used when signs, signals, and barricades do not provide adequate protection to the worker.
- Be prepared for delays.
- Watch for other drivers.
- Flaggers may be hidden or obstructed by larger vehicles.

Traffic issues include: movement of unusual vehicles, oversized loads such as mobile homes, heavy operating equipment

Road work zone safety

- There must be a traffic control plan for the movement of vehicles.
- Traffic Control Devices should be used inside the work zone.
- Flaggers and others providing temporary traffic control should wear high visibility, refelective clothing.
- Flagger stations should be illuminated.
- Flaggers should be trained/certified and use the signaling methods required by the authority in charge.



Component Parts of a Temporary Traffic Control Zone

Hazard: Debris Truck

Hazards include:

- Overhead power lines
- Traffic
- Congested – bottle neck area
- Worker on top of potentially unstable load
- Modified trailer used to haul oversized load debris –
- No traffic control (direction)

Hazard: Electrical, Overhead Power Lines, Downed Electrical Wires, Cables

Hazard Control

- Treat all power lines and cables as energized until proven otherwise.
- Use appropriately grounded low-voltage equipment.
- Stay clear of downed electrical lines.

Jobs Affected

- Debris Removal
- Tree Pruning

Hazard: Exposed Underground Power Lines

Avoid Hazards

- Look for overhead power lines and buried power line indicators. Post warning signs.
- Contact utilities for buried power line locations.
- Stay at least 10 feet away from overhead power lines.
- Unless you know otherwise, assume that overhead lines are energized.
- Get the owner or operator of the lines to de-energize and ground lines when working near them.
- Other protective measures include guarding or insulating the lines.
- Use non-conductive wood or fiberglass ladders when working near power lines.

This is an example of damaged and exposed power lines and cables.

Hazard: Operating a Chain Saw

- Operate, adjust, and maintain the saw according to manufacturer's instructions.
- Properly sharpen chain saw chains and properly lubricate the bar and chain with bar and chain oil.
- Operator should periodically check and adjust the tension of the chain saw blade to ensure good cutting action.
- Choose the proper size of chain saw to match the job
- Include safety features such as a chain brake, front and rear hand guards, stop switch, chain catcher and a spark arrester.

Hazard: Operating a Chain Saw

(Continued)

- **Wear the appropriate protective equipment:**
  - Hard hat
  - Safety glasses
  - Hearing protection
  - Heavy work gloves
  - Cut-resistant legwear (chain saw chaps)
- **Always cut at waist level or below.**
- **Avoid contact with power lines.**
- **Bystanders or coworkers should remain least:**
  - 2 tree lengths (at least 150 feet) away from anyone felling a tree.
  - 30 feet from anyone operating a chain saw to remove limbs or cut a fallen tree.

Hazard: Eye Injuries

- Use safety glasses with side shields as a minimum.
  - An eye wear retainer strap is suggested.
- Consider safety goggles for protection from fine dust particles or for use over regular prescription eye glasses.
- Any worker using a welding torch for cutting must have special eye wear to protect against welding flash.
  - Welding flash causes severe burns to the eyes and surrounding tissue.
- Use only protective eyewear that has an ANSI Z87 mark on the lenses or frames.

Hazard: Flying Debris/Material Handling

- Wear personal protective equipment, including hard hats, safety shoes, eye glasses and work gloves.
- Do not walk under or through areas where cranes and other heavy equipment are being used to lift objects.
- Make sure that you have an up-to-date tetanus immunization.

Hazard: Debris Piles/Unstable Work Surfaces

- Only walk on surfaces you know are stable.
- Use other ways to get to work surfaces, such as bucket trucks.
- Erect scaffolding on stable surfaces and anchor it to stable structures.
- Wear protective equipment provided, including safety shoes with slip resistant soles.
- Use fall protection with lifelines tied off to suitable anchorage points, including bucket trucks, whenever possible.

Hazard: Structural Integrity

- OSHA requires walls or floor to be shored or braced before demolition if workers within structure.
- Cut off, cap or control all service utility lines outside the building before demolition work is started. Notify appropriate utility company in advance.
- If it is necessary to maintain any utilities during demolition, such lines shall be temporarily relocated and protected.
- Determine if any hazardous substances have been anywhere on the property including pipes and tanks. Remove any found hazardous substance before demolition.
- Do not cut or remove any structural or load-supporting members on any floor shall until all stories above such a floor have been demolished and removed.

Hazard: Heavy Equipment

- Forklifts
- Bobcats
- Loaders
- Backhoes
- ATVs

Hazard: Heavy Equipment (Continued)

- OSHA requires machinery to be inspected by a qualified worker before each use.
- Be alert to the activities around you.
- Do not exceed the load capacity of cranes and other lifting equipment.
- Do not walk under or through areas where cranes and other heavy equipment are lifting objects.
- Do not climb onto or ride loads being lifted or moved. Do not ride on equipment or in bucket.

Hazard: Heat Related Illness

Heat Stress	Heat Exhaustion	Heat Stroke
Headache	Headache	Headache
Thirst	Dizziness	Dizziness
Profuse sweating	Confusion	Restlessness
Muscle aches	Nausea	Confusion
	Sweating-pale, clammy skin	Hot, flushed dry skin
	Cramps, legs & abdomen	Body temp above 104°F
	Rapid, weakening pulse & breathing	Unresponsive/disoriented

Hazard: Heat Stress
Heat stroke is a killer

- Drink lots of water.
- Know the signs of heat-related illnesses.
- Monitor yourself and coworkers, use the buddy-system.
- Block out direct sun or other heat sources.
- Use cooling fans/air-conditioning and rest regularly.
- Wear lightweight, light-colored, loose-fitting clothes.
- Avoid alcohol, caffeinated drinks, or heavy meals.
- Get medical help for symptoms such as altered vital signs, confusion, profuse sweating, excessive fatigue.
- Take shelter in shaded areas and, for fire fighters, unbutton and remove bunker gear.

Hydration is critical!!

- Drink plenty of fluids.
- Drink when you're thirsty. Drink sports drinks, instead of water, if you

Hazard: Sunburn

- Prevent overexposing skin. and eyes to sunlight and wind.
- Use sunscreen and lip balm.
- Use protective eyewear.
- Limit exposure.

Sunburn reduces responder readiness and increases the likelihood of skin cancer

Hazard: Too Much Noise

- Wear appropriate hearing protection in noisy work environments.
  - Examples: saws, earth-moving equipment, pneumatic tools.
- A worksite is considered noisy if you have to shout to be heard.

Hazard: Inhalation of Dust Containing Asbestos, Silica and Other Toxins

- Jobs Affected
  - Debris removal and dumping
  - Loading trucks
  - Demolition

N-95 Respirator

- To protect yourself, Wear NIOSH-approved respirators.
  - **If in doubt about respirators, see your supervisor.**
  - An N-95 or greater respirator is acceptable for most activities, including silica and portland cement dust.
  - If asbestos is present, use a half-mask elastomeric respirator with N,R, or P-100 series filters.
  - If airborne contaminants are causing eye irritation, full-face respirators with P-100 organic vapor/acid gas (OV/AG) combination cartridges should be used.

Hazard: Inhalation of Dust Containing Asbestos, Silica and Other Toxins (Continued)

- To protect yourself, Wear NIOSH-approved respirators (continued)
  - Make sure you are fit-tested for a respirator and do a positive and negative seal check every time you were your respirator. Wash it at least once a day.
  - Surgical masks should **not** be used because they do not provide adequate protection.
  - Replace filters when breathing becomes difficult or you detect an odor through organic cartridges.

½ face respirator with P-100/OV/AG cartridges

Hazard: Carbon Monoxide Inhalation

!Carbon Monoxide has no warning properties it is a colorless odorless gas!

Symptoms: Headache, dizziness, drowsiness, or nausea; progressing to vomiting, loss of consciousness, and collapse, coma or death under prolonged or high exposures.

Areas affected from gasoline- or propane-powered generators or heavy machinery:

- **Near operating equipment**
- **Near generators**
- **Fire Pits**
- **Debris Reduction Sites**
- **Burning & Compacting**

Hazard: Chemicals Issues of Concern

- Chlorine tank found in downtown Gulfport.
- 78,000 barrels of oil released at two spills.
- Diesel, gasoline, motor oil, chlorine, liquid oxygen, medical waste and corrosives have been found by crews
- 22,000 facilities in the area have underground fuel tank.
- Industrial/Commercial Chemicals.
- Household Chemicals.

Hazard: Potential Chemical Exposures

Symptoms: Eye, nose, throat, upper respiratory tract, and skin irritation; flu like symptoms; central nervous system depression, fatigue, loss of coordination, memory difficulties, sleeplessness, mental confusion. Chronic effects depend on the extent and the duration of exposure.

Jobs Affected

- Debris Removal
- Site Clean-up

Protection

Hazard specific as identified by supervisor or safety officer.

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Hazard: Mold

After hurricanes and floods, the water creates the perfect environment for mold to grow in homes and other buildings. Exposure to mold can cause wheezing and severe nasal, eye and skin irritation.

- Avoid breathing dust (fungal spores) generated by wet building materials.
- Use an N-95 NIOSH-approved disposable respirator as a minimum when working with small areas of moldy or damp materials. More protection may be needed for extended work.
- Wear long gloves that reach the middle of your forearm. If you are using a disinfectant, a biocide such as chlorine bleach, or a strong cleaning solution, you should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC. Avoid touching mold or moldy items with your bare hands.

Hazard: Blood-borne Disease

- Use latex or similar gloves when handling human remains.
- Replace gloves if punctured or torn
- Do not handle human remains if you have skin cuts or punctures
- Use goggles or face shield and mask for handling human remains, recovering deceased. Make sure to cover your nose and mouth.
- Transport human remains in closed leak-proof, labeled containers.

Hazard: Food-borne Disease

- **Identify and throw away food that may not be safe to eat:**
  - Food that may have come in contact with flood or storm water.
  - Food that has an unusual odor, color, or texture.
  - Meat, poultry, fish, eggs and leftovers that have been above 40 degrees Fahrenheit (F) for 2 hours or more.
  - Food containers with screw-caps, snap-lids, crimped caps (soda pop bottles), twist caps, flip tops, snap-open, and home canned items.
    - These cannot be disinfected if they have been in contact with floodwater.
- **Store food safely**
  - While the power is out, keep the refrigerator and freezer doors closed as much as possible.
  - Add block ice or dry ice to your refrigerator if the electricity is expected to be off longer than 4 hours. Wear heavy gloves when handling ice.

Hazard: Water-borne Disease

Wash Your Hands often!!

Raw sewage bubbles up from a man-hole cover along U.S. Highway 90 in Gulfport.

Hazard: Animals and Insects

- **To protect yourself from mosquitoes:**
  - Use screens on dwellings.
  - Wear long pants, socks, and long-sleeved shirts.
  - Use insect repellents that contain DEET or Picaridin.
- **Beware of wild or stray animals:**
  - Avoid wild or stray animals. Call local authorities to handle animals.
  - Get rid of dead animals according to local guidelines.
  - Wear and clean proper protective clothing when handling carcasses.
- **Fire Ants**

Hazard: Snakes

- **Be on the alert for snakes** that may be hiding in unusual places after flooding.
- If you are bitten:
  - seek immediate medical attention.
  - Try to identify the snake so that if it is poisonous, you can be given the correct antivenin.
  - Do not cut the wound or attempt to suck the venom out. Contact your local emergency department for further care

Other Protective Measures

Sanitation and Personal Hygiene

- Always wash your hands
- Use hand sanitizers frequently
- Exercise good housekeeping
- Only drink from proven potable water sources

Additional information

- This training program is based on recommendations from FEMA, NIEHS, NIOSH, OSHA, CDC and the U.S. Army.
  - You can find a link to their fact sheets and other important information at the National Clearinghouse for Worker Safety and Health Training www.wetp.org .

Summary

- The hazards and issues are dynamic and require vigilance and flexibility.
- The key to a safe response is attention to the safety issues of your work environment.
  - The physical hazards are similar to any construction or demolition site.
  - The health hazards include the hazards associated with the environment

Why This Book Was Created

- This booklet was created by the National Clearinghouse for Worker Safety and Health Training under a contract with the National Institute of Environmental Health Sciences' Worker Education and Training Program (WETP). WETP has trained over a million emergency responders and hazardous waste workers since 1987 to do their jobs safely. WETP is a part of the Department of Health and Human Services, which is a cooperating agency under the Worker Safety and Health Support Annex of the National Response Plan. The Annex was activated on September 11, 2005. As part of the coordinated federal effort, WETP created this booklet and a companion orientation briefing for responders. Both are available at: www.wetp.org.

This book is provided by:

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